

325.5 Payment

A. Base Material

The accepted quantity of base material will be paid for at the Contract Unit Price per cubic yard (meter). This payment will be full compensation for:

- Flagging and directing traffic
- Preparing the patched area
- Furnishing material, including Portland cement and bituminous prime
- Loading, unloading, and hauling material
- Crushing
- Processing
- Mixing
- Spreading
- Watering
- Compacting
- Maintaining material

B. Subgrade Stabilizer-Select Material

Subgrade stabilizer-select material will be paid for at the Contract Unit Price per cubic yard (meter) complete in place and accepted. Payment will be full compensation for:

- Removing and disposing asphalt pavements, base materials, and unsatisfactory subgrades
- Furnishing all material
- Loading, hauling, and unloading material
- Mixing
- Compacting
- Finishing
- Watering

Payment will be made under:

Item No. 325	Soil-cement stabilized base course for patching	Per cubic yard (meter)
Item No. 325	Graded aggregate, cement stabilized base for patching	Per cubic yard (meter)
Item No. 325	Subgrade stabilizer-select material for patching	Per cubic yard (meter)

325.5.01 Adjustments

General Provisions 101 through 150.

Section 326—Portland Cement Concrete Subbase

326.1 General Description

This work includes constructing a subbase composed of a mixture of Portland cement and graded aggregate, or Portland cement, aggregate, and sand. Construct according to these Specifications and to the lines, grades, and typical cross-sections shown on the Plans or established by the Engineer.

Apply the requirements of Section 300 to this work.

326.1.01 Definitions

General Provisions 101 through 150.

326.1.02 Related References**A. Standard Specifications**

Section 109—Measurement and Payment
 Section 300—General Specifications for Base and Subbase Courses
 Section 430—Portland Cement Concrete Pavement
 Section 500—Concrete Structures
 Section 800—Coarse Aggregate
 Section 801—Fine Aggregate
 Section 815—Graded Aggregate
 Section 830—Portland Cement
 Section 831—Admixtures
 Section 832—Curing Agents

B. Referenced Documents

ASTM C 94
 AASHTO T 22
 AASHTO T 126
 GDT 26
 GDT 27
 GDT 28
 GDT 32

326.1.03 Submittals

Prior to construction, submit a grade control plan for the Engineer's approval.

326.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Specification
Fine Aggregate	801.2.01
Portland Cement	830.2.01
Fly Ash	831.2.03
*Graded Aggregate	815.2.01
Coarse Aggregate	800.2.01
Air Entraining Admixture	831.2.01
Chemical Admixtures for Concrete Type A or D	831.2.02
Curing Compound—White, Wax Base	832.2.03
* The gradation requirements of graded aggregate are modified to require 30 to 45 percent by weight passing the No. 10 (2.0 mm) sieve.	

326.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

326.3 Construction Requirements**326.3.01 Personnel**

General Provisions 101 through 150.

326.3.02 Equipment

Provide the equipment and tools necessary to perform this work, including the following.

A. Concrete Batching Equipment

Provide separate bins and weighing hoppers for aggregates and cement in the batching plant. Use separate scales to weigh cement and aggregate.

The Engineer will inspect scales for weighing concrete materials and water measuring devices before their use. Ensure accuracy of scales and water measuring devices of plus or minus 1.0 percent throughout the operating range.

Measure admixtures to an accuracy of plus or minus 3.0 percent.

B. Slip Form Paver and Spreader

To place the subbase mixture, use a self-propelled slip form paver equipped with tracks sufficient to prevent slippage and bogging when loaded.

- Use the paver to strike off, consolidate, and float finish the fresh mixture—all in one pass.
- Operate the paver from a string grade control, or a combination of string control and existing pavement control.
- Use a self-propelled mechanical spreader to distribute the mixture on the grade.

326.3.03 Preparation

Before placing Portland cement concrete subbase, prepare the roadbed as required by the Plans and the Specifications.

326.3.04 Fabrication

General Provisions 101 through 150.

326.3.05 Construction

Produce Portland cement concrete subbase by combining authorized proportions of approved materials in homogeneous, uniform batches.

Ensure that the grade immediately under the subbase does not contribute to deficient thicknesses of either the subbase or pavement. Employ methods to ensure that subbase placement equipment does not cause deficient thickness to areas supporting the equipment.

Produce the subbase as follows:

A. Mixing

The Engineer will determine the design proportions of the required materials based upon mixes prepared in the laboratory or trials performed during construction.

Determine the batch weights required to produce the necessary quantity.

Measure the cement, aggregates, and water separately, to the accuracy specified above. Continue mixing until producing a homogeneous and uniform mixture.

Mix concrete produced in a stationary central mix plant for a minimum of 60 seconds, after all materials have entered the drum. A reduction of mix time may be allowed if representative tests show that the concrete meets the requirements of ASTM C 94, Requirements for Uniformity. In all cases, mix for at least 50 seconds.

Ensure that transit mixed concrete meets the requirements of Subsection 500.3.04.E.3.

B. Placing

Spread the mixture on the grade with minimum rehandling. Hand spread with shovels if necessary. Do not place Portland cement concrete on muddy, puddled, or frozen subgrade.

NOTE: Do not allow workers to walk in fresh concrete with shoes coated with dirt or other foreign substances.

C. Consolidating

Consolidate the mixture by vibrating the full length, width, and depth of the section. Ensure that vibration does not produce puddling or excessive grout accumulation. If consolidation and density are not satisfactory, stop placement and furnish methods or equipment to produce subbase conforming to the Specifications.

D. Finishing

Finish the mixture to the proper cross-section. Use equipment that produces a uniform surface free of irregular, rough, or porous areas. Use a tube float or other finishing device approved by the Engineer to provide a smooth surface. Unless the Engineer permits, do not add water to the surface to aid finishing.

E. Forming Construction Joints

Form a construction joint when mixture placement is interrupted for more than one hour. Construct joints according to Subsection 430.3.05 unless the Engineer waives the requirements concerning reinforcement. Ensure that the straightedge tolerance is 3/8 in (10 mm) in 20 ft (6 m).

F. Curing

Cure the mixture according to Subsection 430.3.05.L.1. Apply compound for the impervious membrane method at the rate of 200 ft²/gal (5 m²/L) or less. Apply a second application of curing compound just before placing the pavement to act as a bond breaker. Apply the second application at the same rate as the first application.

G. Preserving the Subbase

Maintain the subbase until it is covered by the succeeding pavement course.

1. Place the pavement course on the subbase only after the mixture has cured for 7 days.
2. Operate the spreader and slip form paver on the subbase after 7 days, but do not use the subbase as a haul road for loaded trucks, equipment, or other vehicles for 14 days.
 - a. Construct earth ramps and barricades to move traffic across the subbase.
 - b. Remove and replace areas damaged by vehicles or equipment at no additional cost to the Department.

H. Weather Limitations

1. Do not place the subbase mixture when the air temperature in the shade is less than 40 °F (5 °C) and falling. Wait until the air temperature is at least 35 °F (2 °C) and rising.
2. Protect the subbase from rain until the surface has sufficiently hardened to prevent marring.
3. Protect the subbase from cold weather according to Subsection 430.3.05.L.4.

326.3.06 Quality Acceptance

Check the finished surface transversely by a system of ordinates measured from a stringline. Also check the surface with a 20 ft (6 m) straightedge placed parallel to the centerline.

Remove or correct deviations in excess of 3/8 in (10 mm) in 20 ft (6 m). If the Engineer permits, correct low areas by increasing the thickness of the surface course at no additional cost to the Department.

A. Composition of Subbase Mixture

The Department will determine the required proportions based on the test results of sample material. Secure and deliver a sufficient amount of materials to the laboratory for evaluation.

An approved mixture shall conform to the following:

1. Aggregate

Use aggregate that meets the requirements of Subsection 815.2.01. Use aggregates manufactured at the quarry or blended at the plant site to produce the desired results. Place aggregates in one or more stockpiles if the gradation is uniform at the time of batching.
2. Cement

Use at least 275 lbs/yd³ (165 kg/m³) of Portland cement for Portland cement concrete subbase.

Use fly ash as a partial replacement for Portland cement if:

 - a. The quantity of cement replaced is 15 percent or less by weight.
 - b. Cement is replaced by fly ash at the rate of 1.25 lbs to 2 lbs (1.25 kg to 2.0 kg) of fly ash to each pound (kilogram) of cement.

Do not use Type IP cement in fly ash mixes.
3. Water-Cement Ratio

The maximum water-cement ratio shall not exceed 1.3. Calculate the water-cement ratio based on the total cement material used, including fly ash.

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4. Air Content

Maximum design air content shall be 7.0 percent.

5. Slump

Maximum design slump shall be 1.5 in (40 mm).

6. Compressive Strength

Ensure that the mixture is capable of demonstrating a laboratory compressive strength at 28 days of 1,000 psi (7 MPa) $\pm 18R^*$. (*Where: R = the difference between the largest observed value and the smallest observed value for all compressive strength specimens at 28 days, for a given combination of materials and mix proportions prepared together.)

Determine compressive strength from the results of six cylinders prepared and tested according to AASHTO: T 126 and T 22.

B. Field Adjustment of Design Proportions

The Engineer will determine changes in design proportions based on construction conditions and notify the Contractor in writing of the effective date and time of the changes.

C. Mix Tolerances

The Engineer will verify that the mix is proportioned according to the approved mix design. Assume responsibility for determining the required batch weights.

Ensure that variations in consistency and air content of the mixture are within the following limits at the time of placement.

1. Consistency

Slump shall not exceed 2 in (50 mm) as determined by GDT 27.

2. Air Content

Air content shall not exceed 8.0 percent, as determined by the applicable test method in GDT 26, GDT 28, or GDT 32.

D. Acceptance of Subbase Mixture

The Department will accept the mixture based upon results required in the Sampling Testing and Inspection Manual for:

- Slump
- Air tests
- Water-cement ratio
- Surveillance of plant operations and mix production

E. Thickness

Determine thickness by taking probe measurements in the fresh mixture every 250 ft (75 m) or less. Adjust the strike off to compensate for variations in thicknesses. Obtain cores to determine the boundaries of areas subject to thickness correction. A construction tolerance of plus or minus 0.5 in (13 mm) from the Plan depth is permitted.

1. Deficient Thickness

Correct areas deficient in thickness by more than 0.5 in (13 mm) but less than 1 in (25 mm) by increasing the surface course depth. Remove or correct areas deficient in thickness by more than 1 in (25 mm) as the Engineer directs.

The Engineer may base the decision to remove or correct the area on a Plan submitted by the Contractor detailing how to obtain the final pavement profile and grade.

2. Excessive Thickness

Remove areas with excessive thickness when the Engineer requires. Removal is not required when the excessive thickness does not result in a surface course deficient in thickness.

326.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

326.4 Measurement

Portland cement concrete subbase is measured by the square yard (meter) as noted in Section 109, complete in place and accepted.

326.4.01 Limits

General Provisions 101 through 150.

326.5 Payment

Portland cement concrete subbase will be paid for at the Contract Unit Price per square yard (meter) for each specified thickness shown on the plans. This payment will be full compensation for:

- Providing Portland cement and all other materials
- Applying first and second applications of curing compound
- Providing all equipment and labor
- Mixing
- Hauling
- Providing other incidentals necessary to complete the Item
- Replacing subbase when required

Payment will be made under:

Item No. 326	Portland cement concrete subbase ____ in (mm) thick	Per square yard (meter)
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326.5.01 Adjustments

General Provisions 101 through 150.

Section 327—Mining, Crushing, and Stockpiling Aggregates

327.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 328—Foamed Asphalt Stabilized Base Course

328.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 400—Hot Mix Asphaltic Concrete Construction

400.1 General Description

This work includes constructing one or more courses of bituminous plant mixture on the prepared foundation or existing roadway surface. The mixture shall conform with lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer.

This section includes the requirements for all bituminous plant mixtures regardless of the gradation of the aggregates, type and amount of bituminous material, or pavement use.

Work will be accepted on a lot-to-lot basis according to the requirements of this Section and Section 106.

400.1.01 Definitions

Segregated Mixture: Mixture which lacks homogeneity in HMA constituents of such a magnitude that there is a reasonable expectation of accelerated pavement distress or performance problems. May be quantified by measurable changes in temperature, gradation, asphalt content, air voids, or surface texture.

New Construction: A roadway section more than 0.5 mile (800 m) long that is not longitudinally adjacent to the existing roadway. If more than one lane is added, and any of the lanes are longitudinally adjacent to the existing lane, each lane shall be tested under the criteria for a resurfacing project.